Title: Fishing for Fractions

Brief Overview:

This unit involves sorting and classifying shapes, identifying and representing common fractional parts for 1/4, 1/3, 1/2, and developing an understanding of fractions as parts of a unit whole. Card games and scenarios will be utilized to engage students in learning. Students read *The Adventure of Fernando Fourth* and go on an in-class-fishing trip to try to catch Fernando. The unit will end with a writing piece assessing student knowledge of fractional parts.

NCTM 2000 Principles for School Mathematics:

- **Equity:** *Excellence in mathematics education requires equity - high expectations and strong support for all students.*
- **Curriculum:** *A curriculum is more than a collection of activities: it must be coherent, focused on important mathematics, and well articulated across the grades.*
- **Teaching:** *Effective mathematics teaching requires understanding what students know and need to learn and then challenging and supporting them to learn it well.*
- **Learning:** *Students must learn mathematics with understanding, actively building new knowledge from experience and prior knowledge.*
- **Assessment:** *Assessment should support the learning of important mathematics and furnish useful information to both teachers and students.*
- **Technology:** *Technology is essential in teaching and learning mathematics; it influences the mathematics that is taught and enhances students' learning.*

Links to NCTM 2000 Standards:

- **Content Standards**

Number and Operations
Activity sheets are provided to identify, represent and illustrate commonly used fractions -- 1/4, 1/3, and 1/2, connecting quantities they represent in relation to a whole.

Measurement
The "Aqua Mart Accident" scenario provides students the opportunity to use 6-inch fish as a standard to measure fractional parts.

Data Analysis and Probability
Through the "Go Fish" game, students will sort and classify fish according to their fractional parts and represent data by constructing a pictograph.

- **Process Standards**

  <u>Problem Solving</u>
  While playing the game of "Go Fish", students will use problem solving to identify fractions and partner fractions in relation to a whole.

  <u>Reasoning and Proof</u>
  The storybook writing will assist students in developing and evaluating mathematical arguments and proofs.

  <u>Communication</u>
  Through the variety of activities provided in this unit, students will be encouraged to express mathematical ideas, analyze and evaluate the mathematical strategies, and communicate their mathematical ideas clearly to peers, teachers, and others.

  <u>Connections</u>
  Dispersed throughout this unit, interrelationship of part to whole, whole to part, and part of a set will be emphasized through discussion, hands on activities and review.

  <u>Representation</u>
  Students will communicate mathematical ideas through reflection prompts.

Grade/Level:

Grade 2, Reading: Emergent

Duration/Length:

This unit will take approximately four class periods (50 minutes each).

Prerequisite Knowledge:

Students should have working knowledge of the following skill:

- Number recognition
- Color recognition – specifically red, green, yellow, and blue

Student Outcomes:

Students will:

- identify, construct, and compare common fractions (1/4, 1/3, 1/2) which are part of a whole.
- sort and classify objects by size and fractional part, utilizing nonstandard units of measurement.
- construct a pictograph.
- solve a real-life problem.

- expand their mathematical vocabulary.

Materials/Resources/Printed Materials:

- 2”x8” strips of paper (4 strips per student - Day 1)
- 8 ½” x 11” construction paper (one per student)
- Go Fish cards
- Masking tape
- Pencils, crayons, or colored pencils
- Scissors
- Magnets and thread attached to poles/yard stick/meter stick (4 of each – Day 1)
- Paper clips for Go Fish – Day 3
- Student Resource Sheets #1-17
- Teacher Resource Sheets #1-3
- Soothing ocean music – CD or tape

Development/Procedures:

Day 1:

Teacher Preparation:

- Secure a copy of the storybook, *The Adventure of Fernando Fourth* by Eileen McDougall.

- Cut 2” x 8” strips of paper, at least 4 per student.

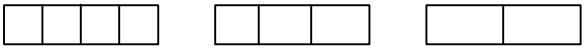
- Duplicate “Color Activity” **Student Resource Sheet 1.**

Anticipatory Set:

- Introduce the unit by saying, “I have decided to take the class on a fishing trip. We will be catching some very unusual fish. Over the next few days we will be preparing for our trip by studying fractions.”

- Begin the unit by reading the story of, *The Adventure of Fernando Fourth* by Eileen McDougall. Initiate a class discussion on “What is a fraction?”

Procedure:

- Using a transparency on the overhead, draw a 2” x 8” rectangle. Model the division or separation of fourths, thirds, and halves.
  Example: 

- As you are modeling, focus on the separation of a part from a whole. (A cut in the middle separates the rectangle into two pieces. Each piece is called a half.)

- Give each student four 2"x 8"strips of paper. On one strip, tell them to draw a line to separate the piece of paper into two equal parts.

- Discuss and explain that each part is called 1/2. Show them how the fraction is written. Stress that we read this as "one half" and "two halves", not "one twos."

- Have them write that fraction on both of their halves in word and symbolic form (1/2, one-half).

- Follow the same procedure, with thirds and fourths, writing the fractions on each piece as they go.

- Independent Practice: Have the students complete "Color Activity", **Student Resource Sheet 1**.

Closing:

- Students will pair up to play the card game, "Go Fish" **Student Resource Sheets 2-6.**

Day 2:

Teacher Preparation:

- Duplicate and make a transparency of "Aqua Mart Accident", **Student Resource Sheets 7 and 8** to model activity instructions

- Duplicate fish black-line master **Student Resource Sheet 8** (one per student).

Anticipatory Set:

- Review previous day's concepts through discussion.

- Ask students to explain what they have learned so far or don't understand about 1/4, 1/3, and 1/2.

- Explain that today we are going to compare the size.

Procedure:

- Students will determine the fraction of each fish piece by seeing how many fish will fill each fish tank. Handout "Aqua Mart Accident" **Student Resource Sheet 7** and read story together (choral reading).

- Instruct students to carefully color and cut each fish from **Student Resource Sheet 8**.

- Focus student's attention on the "Aqua Mart Accident". Have each child identify the fraction name for each tank.

- Have each student identify the largest fish. Explain that this is a whole and is shown by the number 1 in the tank. Next, have students glue the whole into place.

- Using the cutouts, compare and measure the remaining fish to the whole, then decide which tank to put the fish in. Before students glue, you must check for understanding.

Closing:

- Provide each student with an 8 1/2"x11" or 11" x 14" piece of construction paper. This will represent the fish tank. Have the students fold the paper into fourths.

- Have them draw and color fish into 1/4, 1/3, or 1/2 sections of the paper (their preference).

- Share illustration with other students to see if they can identify the fractional representation of the fish tank.

Day 3:

Teacher Preparation: (one-set/8 children)

- Copy on colored card stock (one fish per student) from "Fishing Trip" **Student Resource Sheet 9** black line master.

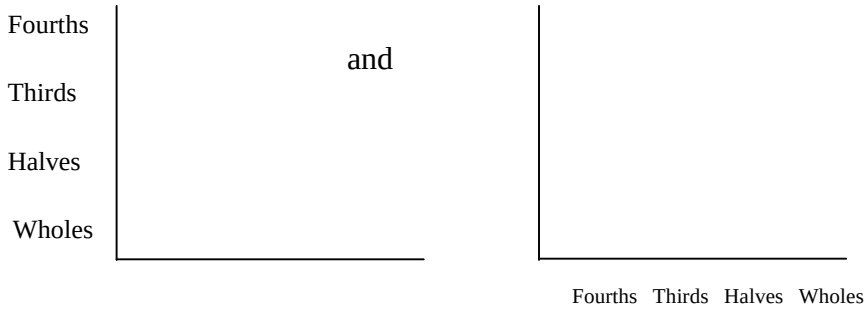
    - Option 1: Cut out fraction cards from paper. Select a fraction and glue it on the fish in the space provided. Laminate and cut out fish. Attach a paper clip to the mouth of each fish, except Fernando.
    - Option 2: Laminate entire sheet. Cut out fraction cards and fish. Attach Velcro to the fish in the space provided and the back of the cards so fractions can be easily inter-changed. Attach a paper clip to the mouth of each fish, except for Fernando.

- Copy, color accordingly (red, green, yellow, blue) and laminate **Teacher Resource Sheet 1**.

- Attach a magnet to a piece of yarn about 3 feet long and tie it to the end of a meter or yard stick. This will represent the fishing pole.

- Cut a piece of yarn 8 feet long and tie the ends together. This will represent your pond. (The piece of yarn can be cut to adjust for any area.) Place fish inside the pond.

- Draw a pictograph on the chalkboard. Example:



Pictograph A Pictograph B

- If your chalkboard is not magnetized, have strips of masking tape for each child to attach fish to board.

Anticipatory Set:

Say, "We have learned quite a lot about fractions. I think we are ready for our fishing trip. Remember the story, *The Adventure of Fernando Fourth.* Let's try to catch Fernando the fish." Show children the pond and fishing pole(s).

Procedure:

- Have students sit around the edge of the pond and select one student to begin.
- Students will continue to take turns fishing moving to the left (clockwise).
- Let each student take a turn fishing for a card. Once they have caught their fish card, have them identify what kind of fraction fish they have caught.
- Note: Fernando does not have a paper clip because he is NOT to be caught as in the story.
- Have them place their fish on the pictograph in the proper row (wholes, halves, thirds, fourths).

Closing:

- After each student has placed a fish on pictograph A, discuss the data.
- Move the fish from Pictograph A to Pictograph B so that students can see a different visual representation of the data. Review data on the second graph.

Day 4: Culminating Activity

Teacher Preparation:

- Copy the modified storybook adventure *The Adventure of Fernando Fourth* by Eileen McDougall **Student Resource Sheets 10-17.**

Anticipatory Set:

- Read story aloud to students.

Procedure:

- Distribute the storybook to each student.
- Explain to the students that now they are going to be in the story. Have them read and fill in the blanks as they go.

Performance Assessment:

- Students will complete their own version of the story, filling in the blanks.
- Answer key **Teacher Resource Sheet 2** is provided for the teacher.
- Use **Teacher Resource Sheet 3**, Total Unit Rubric, for scoring.

Extension/Follow Up:

- Play level 2 of "Go Fish" card game.
- Students can make a fraction book, tracing pattern blocks or using drawing tools, incorporating sixths.
- Read other math literature related to the use of fractions:

  Matthews, Louise. *Gator Pie*. Sundance Publishing, Littleton: Massachusetts, 1995.

  Tierney, Cornelia and Berle-Carman, Mary. *Fair Shares: Investigations in Number, Data and Space, Grade Level 2 and 3*. Dale Seymour Publication, White Plains: NY, 1998.

Glossary:

- Clockwise - going from the right to the left in a circular fashion like a clock
- Compare - similar, equal
- Delicacy - tasty
- Half - one of two equal parts that together make a whole, 1/2

- Third – one of three equal parts that together make a whole, 1/3
- Fourth – one of four equal parts that together make a whole, 1/4
- Fraction – a part of a whole object or a part of a set of objects
- Part – a portion or segment of a whole
- Swish – a hissing sound

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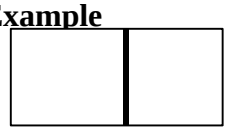
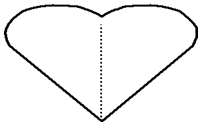
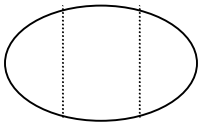
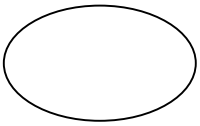
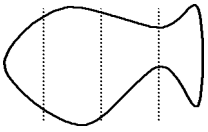
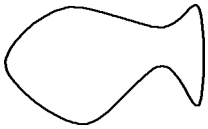
Fraction Fishing

Trace over line through each object to show the correct fraction.	Color the portion of the object to show the correct fraction.	Write the fraction name using symbols.	Write the fraction name using words.
Example 		$\frac{1}{2}$	**One-half**
		$\frac{\square}{\square}$	
		$\frac{\square}{\square}$	
		$\frac{\square}{\square}$	

GO FISH!

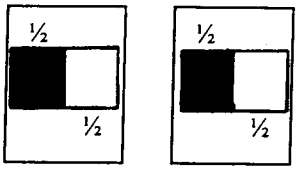
Object: The object of the game is to make as many pairs as possible.

Materials: Student Resource Sheet 3

Beginning the Game:

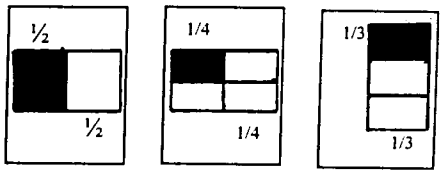
Step:

1) Select a dealer. Shuffle the deck and deal five cards to each player.
2) Place the remaining card's face down in the center of the playing area. This will be your pond.
3) Sort your cards in your hand.
4) If you have any pairs or matches in your hand, place those cards on the table. Example:



5) The person to the left of the dealer begins. You may ask any other player if they have a card that will match one that you are holding. Example:

- Your hand may look like this→



- You would want to ask for a half (1/2), or a third (1/3), or a fourth (1/4) by saying, "Do you have a ____?"

6) If the player you ask has that card, he/she gives it to you. You place the pair on the table next to you.

7) If that player does NOT have your card they need to say," GO FISH". You will then pick a card from the center of the table or "pond".

8) If the card you pick up matches one you are holding in your hand, you have made a match. You may place those two cards on the table next to you. If it does not, you hold it in your hand until it is your turn again.

9) Your turn is now over and the player on your left goes next following steps 5-8.

10) When you use your last card in your hand and there are fish still left in the pond, on your next turn pick one card from the pond to continue playing.

Winning the Game: When there are no fish left in the pond, players will count their pairs, NOT each card. The player with the most pairs WINS!

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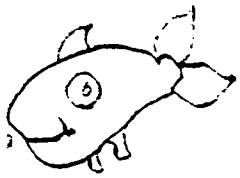

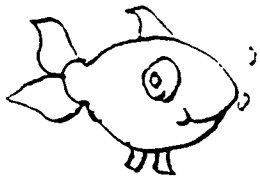

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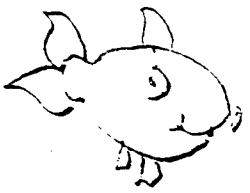

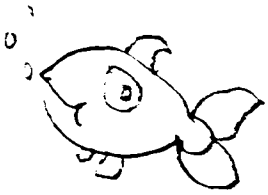

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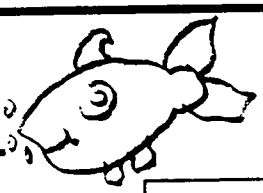

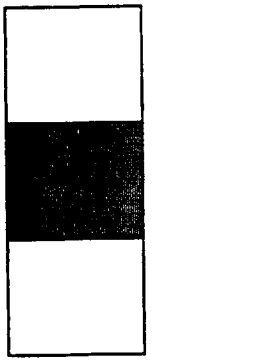

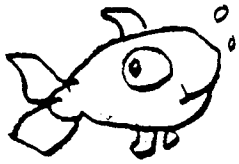

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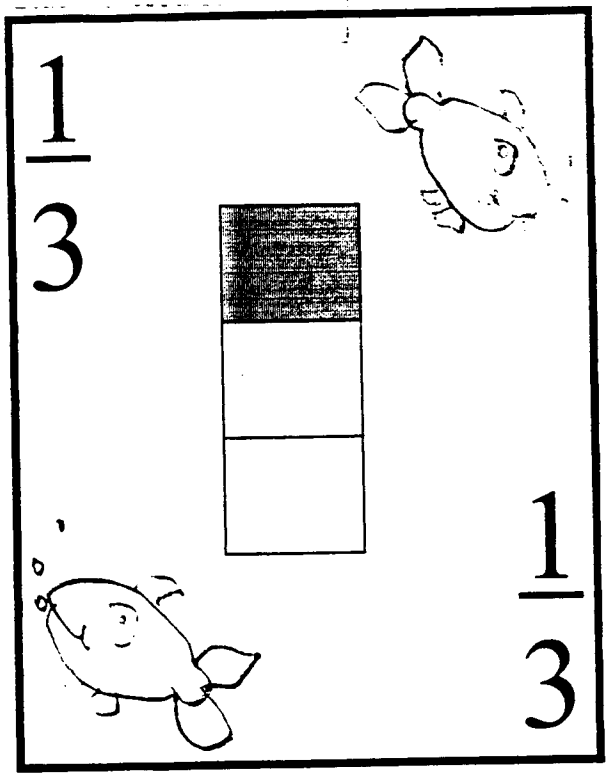
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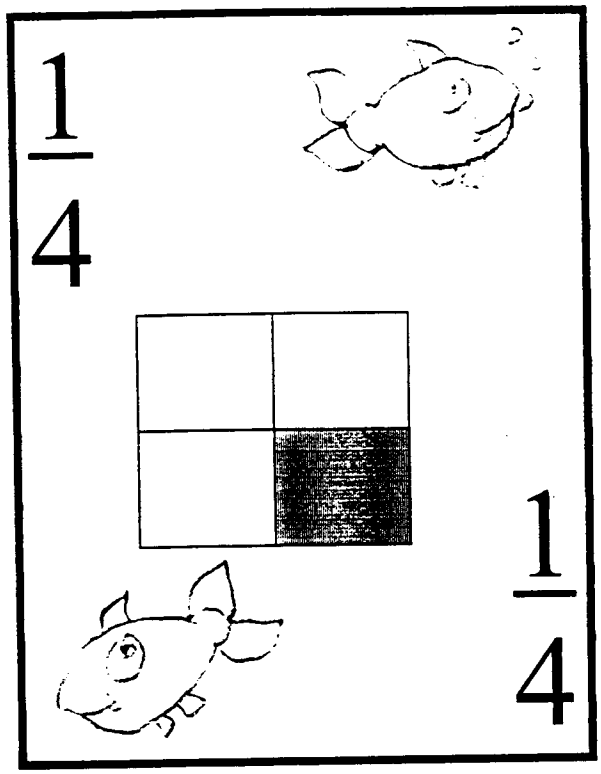
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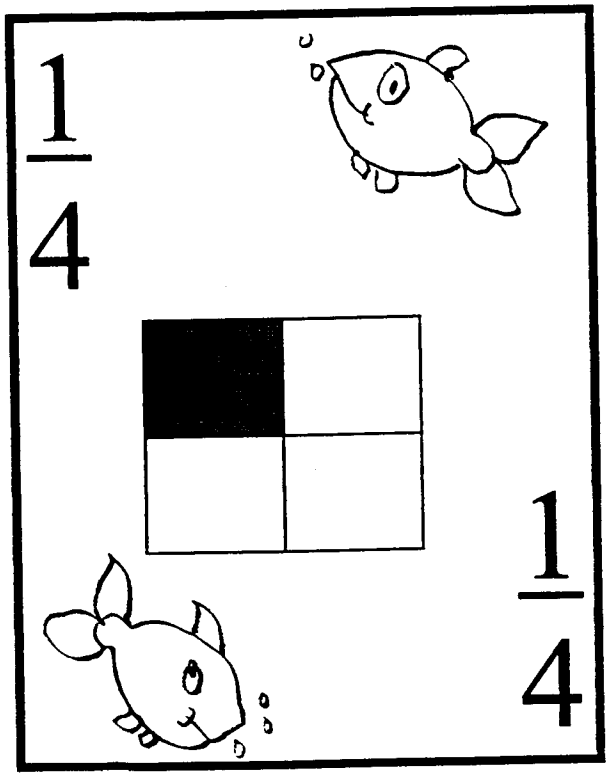
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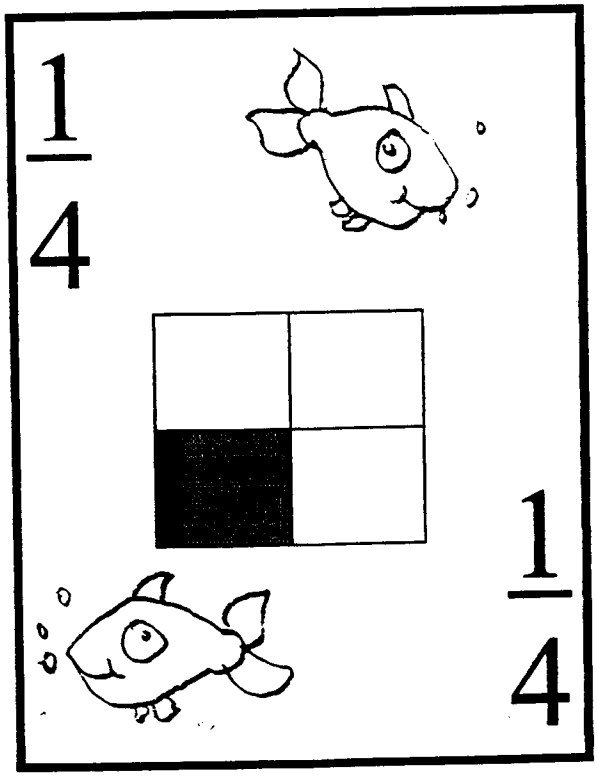
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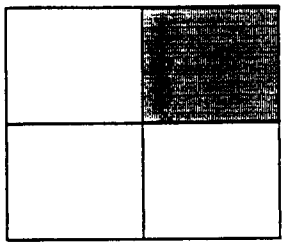

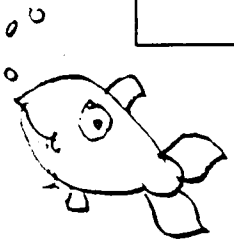

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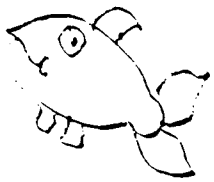

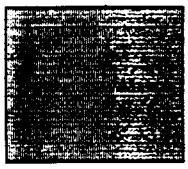

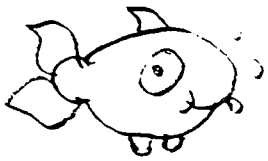

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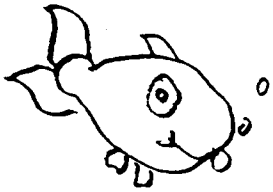

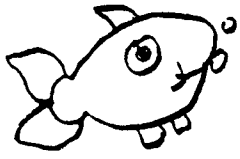

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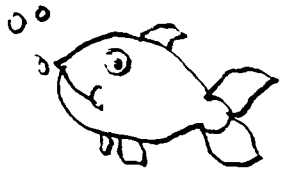

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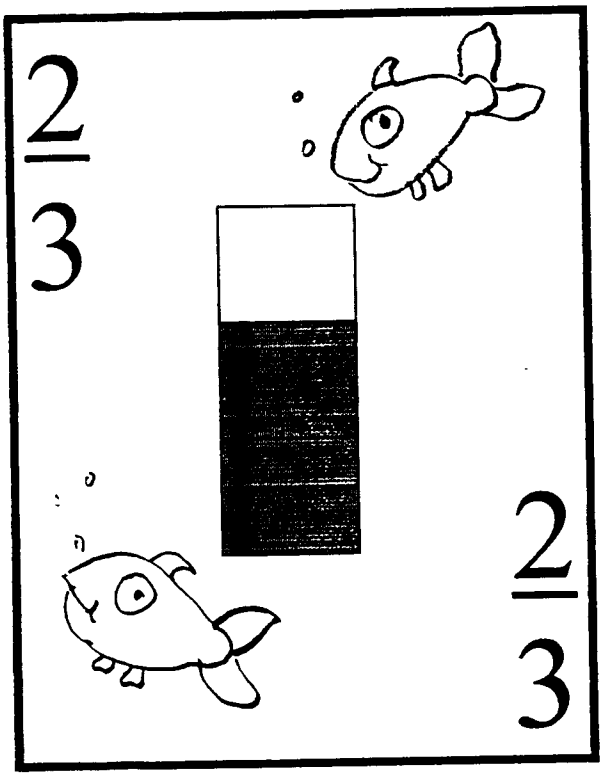
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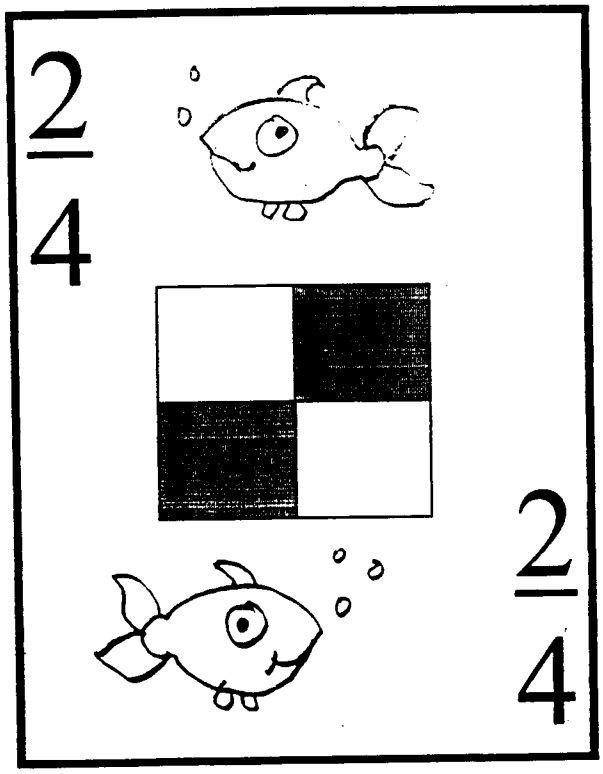
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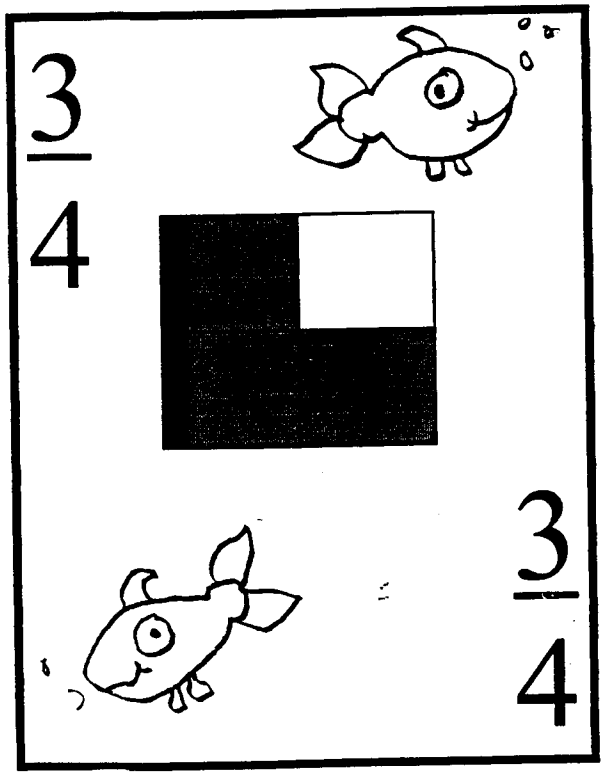
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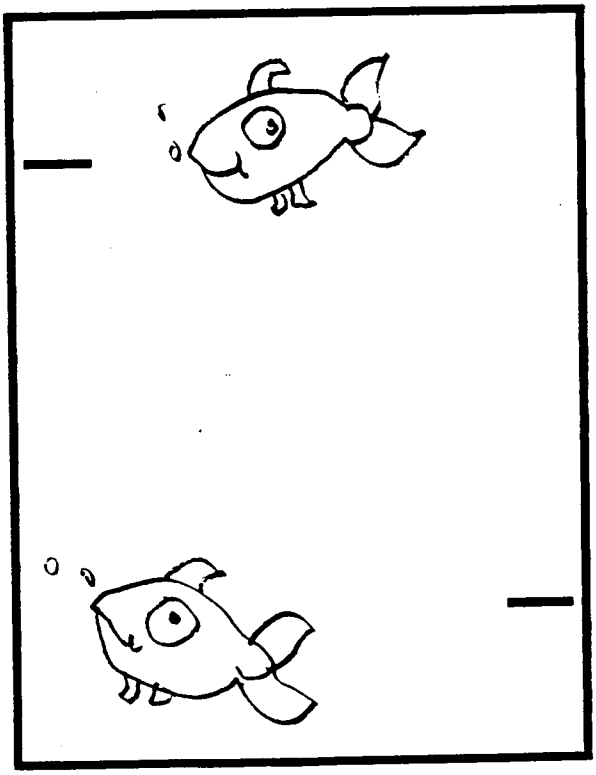
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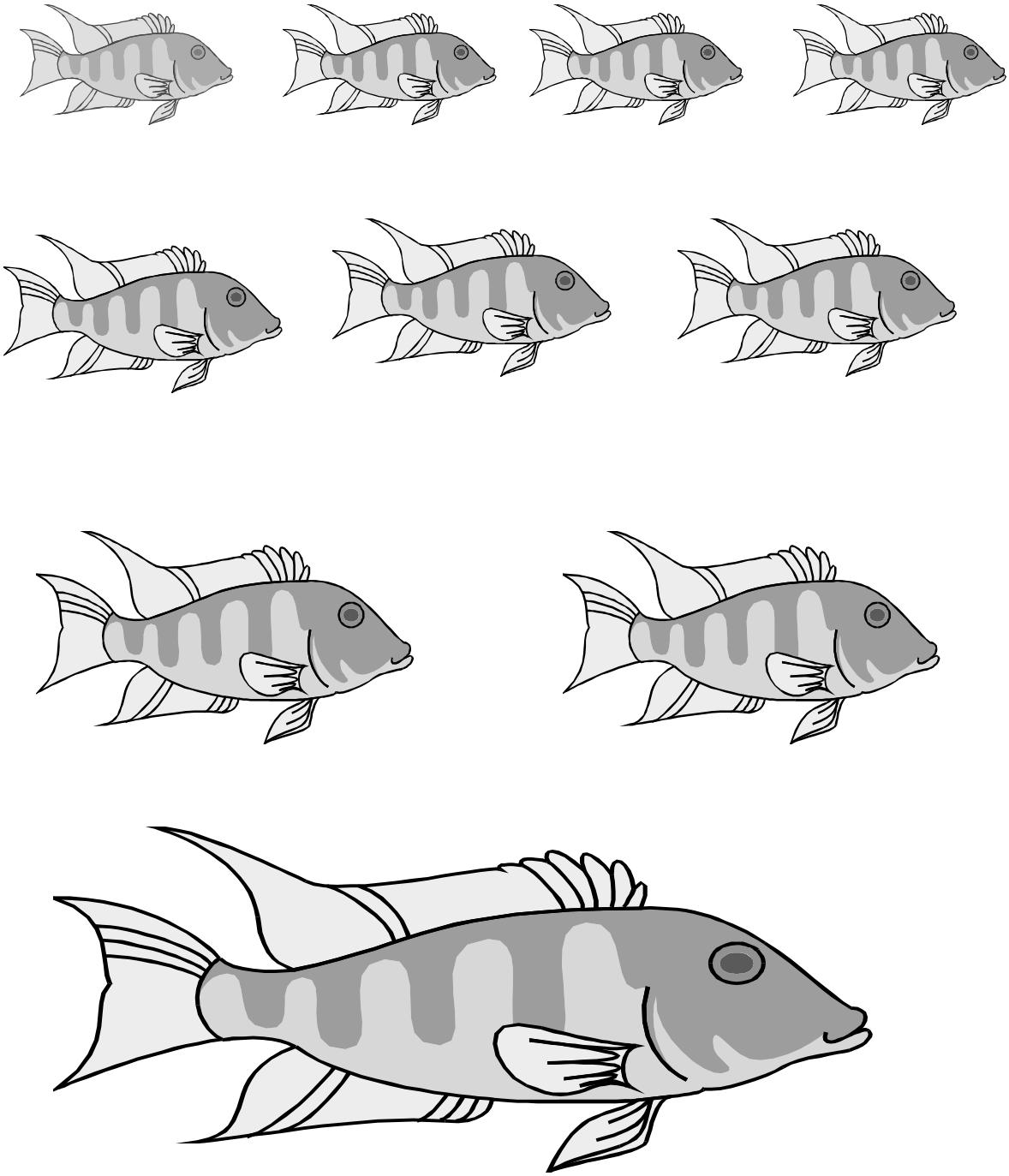
Student Resource Sheet 7

Oh, no! Our fish arrived mixed together. Can someone help us figure out to what tank each fish belongs?

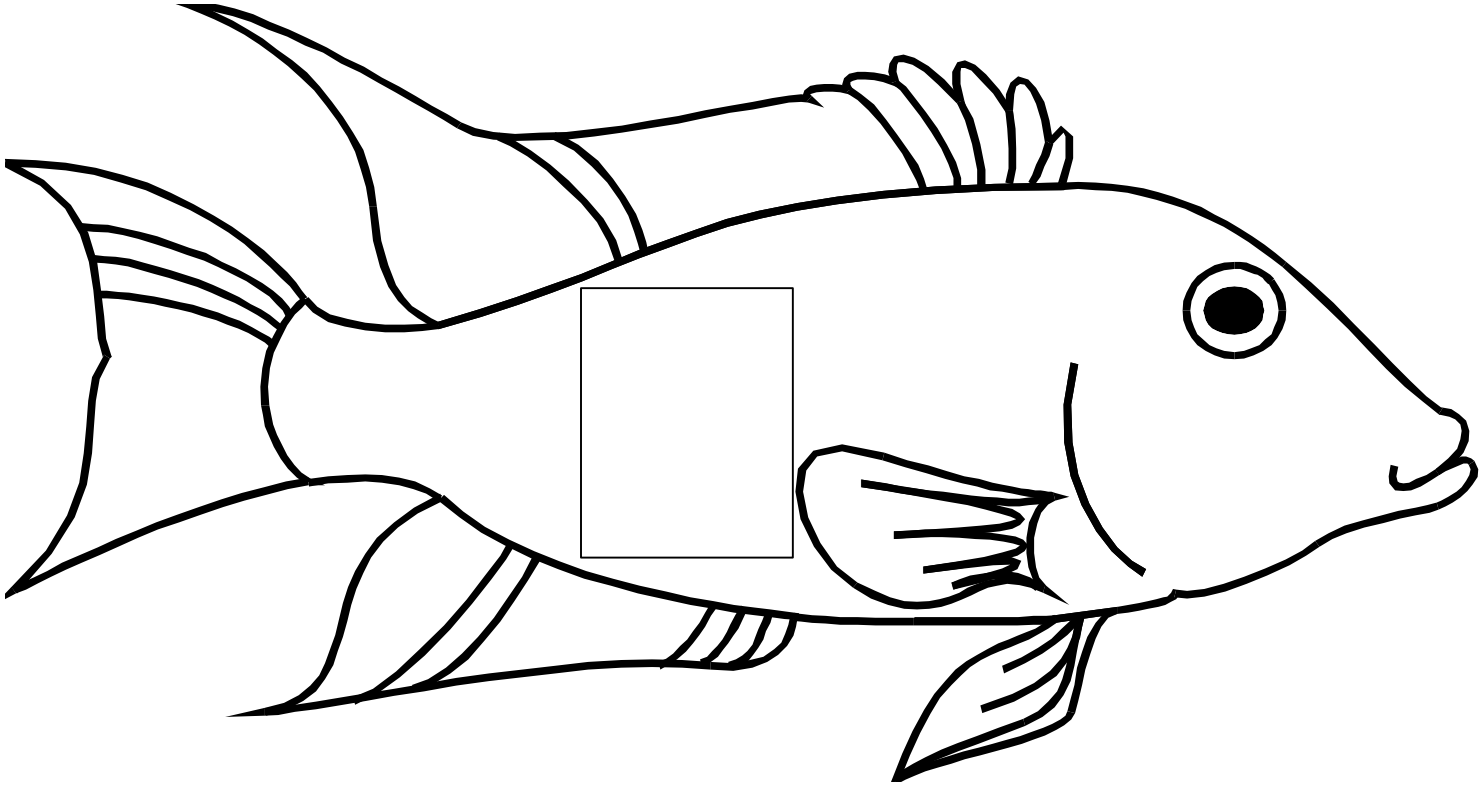
Directions: Cut out the whole fish and glue it in the tank it belongs. Cut out the rest of the fish on your sheet. Using the large whole fish as your standard, measure the length of the other fish you have cut out and figure out which tank each fish belongs. When you think you have the answer, raise your hand and wait for your teacher. Good Luck!

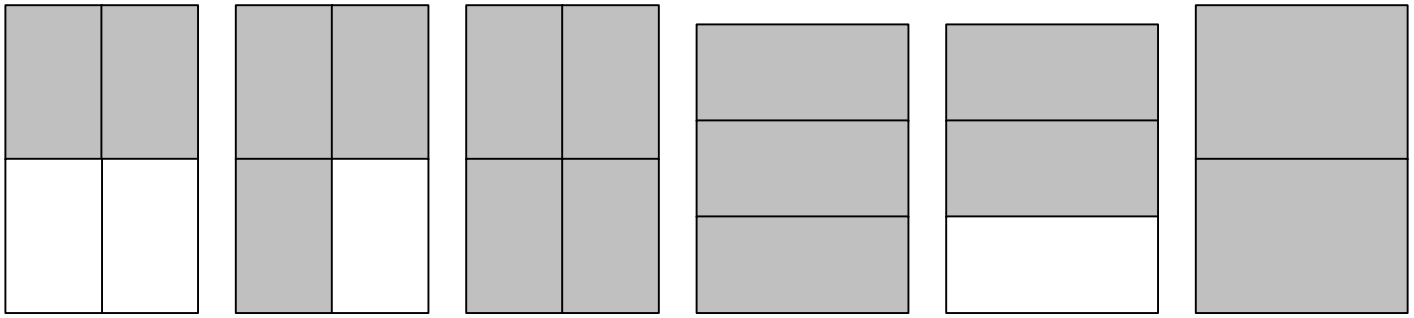
	Size 1 whole
	Size 1/2
	Size 1/3
	Size 1/4

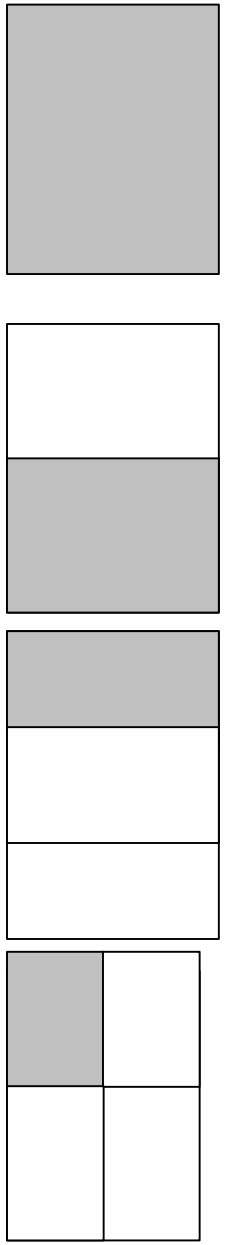
Student Resource Sheet 8
Fish Black Line Master



Student Resource Sheet 9
Fishing Trip Black-line Master







Written By: _____

Date: _____

Teacher: _____

_____ was a _____ who liked to fish. _____ loved to watch them go
1. (Name) 2.(boy/girl) 3.(He/She)

swish, swish. Everyday _____ walked to the pond with _____ fishing pole, a
4. (he/she) 5. (his/her)

pail, and hat on. This pond was very special you see,

fraction fish are a <u>delicacy</u>.

6.

7.

There were Half families,

8.

9.

Whole families,

10.

12.

11.

Third families too.

13.

14.

Fourth families were different colored red, green, yellow, and blue.

In this pond lived Fernando Fourth who was brave, clever, and really smart.

He even graduated from Aquamentry School, with very high marks!

As _____ came close, Fernando had to think about what to do.
15. (Name)

How can ___ save ___ Fourth family, Papa, Mama, and little sister, too?
16. (he/she) 17. (his/her)

_____ casts _____ line into the pond.
18. (Name) 19. (his/her)

KERPLUNK! It went sinking down... down... down.

Fernando thought of a way not to be caught, so he tugged on the hook and up it popped. Over _____'s head the hook did fly landing **very, very, VERY** near by. Fernando just watched and began to laugh, as _____ ran home with the hook, caught in the seat of _____ pants.

20. (Name)

21. (Name)

22. (his/her)

Reflection

1) What can you tell me about fractions that you didn't know before?

_____

_____

_____

_____

2) Describe a fraction that you see outside in nature.

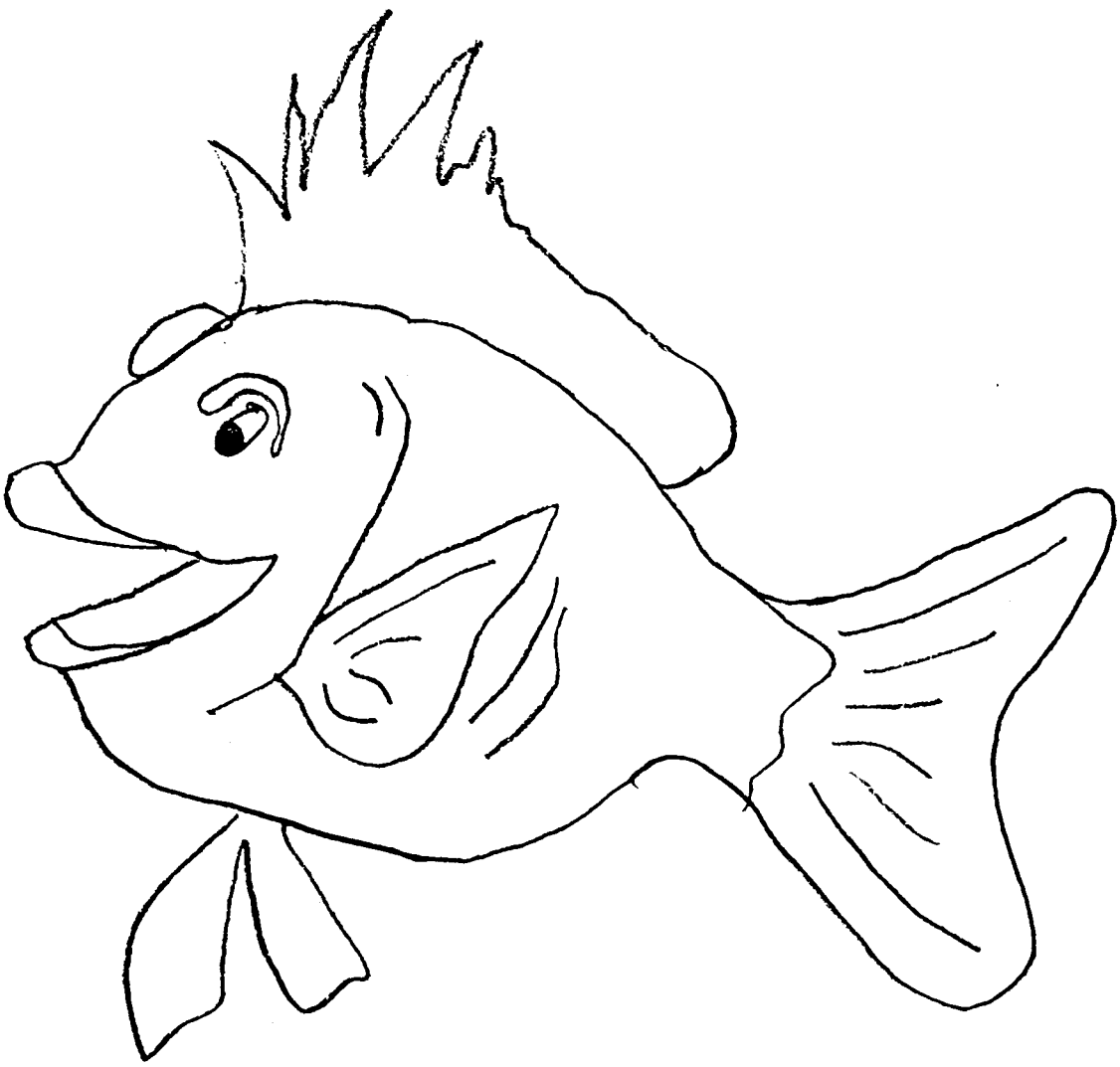
_____

_____

_____

_____

Copy, color accordingly (red, green, yellow, or blue), and laminate.



Teacher Scoring Key

The Adventures of Fernando Fourth!

Total Points Possible: 30

#	Task Answer	Points
1.	Answers will vary. Each student should correctly write his or her name.	1
2.	Answers will vary. Each student should write boy or girl to describe their gender.	1
3.	Answers will vary. Each student should write he or she to describe their gender.	1
4.	Same as #3	1
5.	Answers will vary. Each student should write his or her to describe their gender.	1
6.	Each student should color in one-half of the fish.	1
7.	Same as #6	1
8.	Each student should color in the entire fish.	1
9.	Same as #8.	1
10.	Same as #8	1
11.	Answers may vary. Give credit if the student colored in one-third of each fish or colored the fish using three different colors to represent thirds.	1
12.	Same as #11	1
13.	Same as #11	1
14.	Give credit if the student colored each fish using the specific four colors to represent fourths. If student used different colors but shaded in fourths 0 points are given.	1
15.	Same as #14	1
16.	Same as #14	1
17.	Same as #14	1
18.	Same as #1	1
19.	Same as #5	1
20.	Same as #1	1
21.	Same as #1	1
22.	Same as #5	1
----	Following Directions	2
	Reflection Scoring	
1.	Student responses will vary. Students can use either symbols or words to represent fractional parts. Give full credit if they: • Explain a relationship between a half and a whole. (Example: "If I cut a fish in half, it is ½. Or when I cut something in three pieces, it is cut into thirds). • Describe that a fraction is a part of a whole. (Example: If I put two halves together it makes a whole. Or if I put four pieces together, I make a whole fish).	2
	Score half credit if they: • Draw a picture representing fractions. • Have partial understanding either part to whole or whole to part.	1
2.	Student responses will vary. Students can use either symbols or words to represent fractional parts. Give full credit if they: • Describe part to whole or whole to part using plant animals etc. (If I see four trees and one of them is big, ¼ tree is big. Or If I cut down a tree and saw it in two, I make halves or ½.	2
	Score half credit if they: • Have partial understanding either part to whole or whole to part.	1

Fishing for Fractions
Total Unit Rubric

Student Name: _____

Date: _____

#	Activity	Points	Students Score
1	Coloring Activity Fraction Sheet	4	
2	Aqua Mart Accident	5	
3.	Fraction Fish Puzzle	2	
4.	Storybook and Reflection	30	
Total Possible		41	